

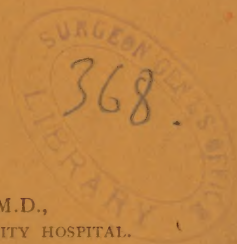
ADLER (L.H.) Jr.

REPORT OF AMPUTATIONS
PERFORMED AT
THE HOSPITAL
OF THE
UNIVERSITY OF PENNSYLVANIA
FROM
SEPTEMBER 30, 1874,
TO DECEMBER 31, 1888.

BY

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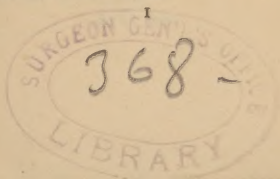
REPORT OF AMPUTATIONS PER-
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The cases tabulated in the following paper comprise largely amputations done on account of railway accidents; which are always extremely dangerous, and are liable to be followed by bad results, even in subjects enjoying perfect health at the time of the accident, owing to the tendency to the development of mortification and pyemia.

Again, the results of the work of such men as Dr. D. Hayes Agnew, Dr. John Neill, and Dr. John Ashhurst, Jr., in a large institution such as the Hospital of the University of Pennsylvania, cannot but add somewhat to our knowledge of the mortality resulting from amputations.

The majority of these operations were done before the present strict antiseptic treatment came into vogue, and it is certain that the statistics of the future will make a better showing. But still, the care and personal attention of the Surgeon-in-chief, which have always characterized the treat-



ment of such cases in this Hospital, both during the operation itself and during the period following it, are important factors in the reduction of the mortality from this operation.

I have followed in the arrangement of the statistics in this paper the plan adopted in similar papers, by both Dr. George W. Norris,¹ and Dr. Thomas G. Morton,² surgeons to the Pennsylvania Hospital, in their published reports of the statistics of amputation.

In the tables sub-joined, all amputations in which the operation was performed within twenty-four hours subsequent to the accident are included under the head of Primary. The other divisions—Secondary and Chronic—explain themselves.

Of 290 patients upon whom 320 amputations were performed during a period of a little over fourteen years—(extending from the opening of the hospital, in 1874, to 1889 inclusive) 73 died, or 25.1 per cent.

Of this number 21 were primary double amputations; 3 primary triple amputations; 1 secondary double amputation, and 2 were double amputations for chronic trouble.

¹ *American Journal of the Medical Sciences*, vols. xxii, xxvi and xxviii. See also a similar account, dating from January 1, 1850, to January 1, 1860, with a general summary of the mortality following the operation in the Pennsylvania Hospital for 30 years. *Contributions to Practical Surgery*—Norris. Lindsay & Blakiston, 1873.

² *American Journal of the Medical Sciences*, 1870 and 1875.

Of the 21 primary double amputations 11 patients recovered; 10 died, or 47.6 per cent.

Of the three primary triple amputations 2 patients died, or $66\frac{2}{3}$ per cent.

The case of secondary double amputation recovered.

Of the cases of secondary amputations for chronic trouble, all the patients recovered.

TABLES OF DOUBLE AND TRIPLE AMPUTATIONS.

| <i>Double amputations :</i> | | <i>Result.</i> | <i>Age.</i> |
|-----------------------------|-----------|----------------|-------------|
| Shoulder-joint and arm | Primary | Died | 21 |
| Arm and thigh | " | Rec. | 28 |
| " leg | " | D | 21 |
| " " | " | " | 35 |
| Forearm and leg | " | R | 48 |
| " " | " | " | 45 |
| Hip-joint and leg | " | " | 15 |
| Thigh and foot | " | D | 25 |
| Knee-joints (both) | " | R | 28 |
| " " | " | D | 32 |
| Knee-joint and leg | " | " | 41 |
| " " | " | " | 50 |
| " " | " | R | 25 |
| Legs (both) | " | " | 22 |
| " | " | D | 21 |
| " | Chronic | R | 23 |
| " | Primary | D | 63 |
| " | " | R | 18 |
| Leg and foot | " | " | 25 |
| " | " | " | 19 |
| " | " | D | 34 |
| " | " | R | 21 |
| Feet (both) | Secondary | " | 29 |
| " | Chronic | " | 61 |

These cases number 24; 14 patients recovered; 10 died, or a percentage of 41.7.

| <i>Triple amputations:</i> | | <i>Result.</i> | <i>Age.</i> |
|----------------------------|---------|----------------|-------------|
| Arms (both) and thigh . | Primary | D | 15 |
| Forearm, thigh and leg | " | R | 26 |
| Forearm and legs (both) | " | D | 45 |

Of the 263 patients who had but one limb amputated, 201 recovered; 62 died, or 24.4 per cent.

180 cases were primary single amputations; of this number, 140 patients recovered; 40 died, or 22.2 per cent.

3 were cases of secondary single amputations; of this number all the patients died, or 100 per cent.

80 were cases of single amputation for diseases of a chronic nature; of this number 61 patients recovered; 19 died, or 23.75 per cent.

TABLE SHOWING THE VARIOUS SINGLE AMPUTATIONS, WITH THE RESULTS.

| | | <i>Result.</i> |
|----|--|----------------|
| 8 | Shoulder-joint amputations Primary | R |
| 3 | " " " " " " | D |
| 2 | " " " " " " Chronic | R |
| 30 | Arm amputations Primary | R |
| 5 | " " " " " " " " | D |
| 4 | " " " " " " Chronic | R |
| 20 | Forearm " " " " " " Primary | R |
| 2 | " " " " " " " " | D |
| 5 | " " " " " " Chronic | R |
| 3 | Wrist-joint amputations Primary | " |
| 15 | Hand amputations " " | " |
| 3 | " " " " " " Chronic | " |

| | | | | Result. |
|----|------------------------------|-----------|--|---------|
| 1 | Hip-joint amputation | Chronic | | D |
| 12 | Thigh " | Primary | | R |
| 14 | " " | " | | D |
| 11 | " " | Chronic | | R |
| 7 | " " | " | | D |
| 1 | " " | Secondary | | " |
| 11 | Knee-joint " | Primary | | R |
| 3 | " " | " | | D |
| 3 | " " | Chronic | | R |
| 5 | " " | " | | D |
| 34 | Leg amputations | Primary | | R |
| 12 | " " | " | | D |
| 26 | " " | Chronic | | R |
| 6 | " " | " | | D |
| 2 | " " | Secondary | | " |
| 1 | Ankle-joint amputation . . . | Primary | | " |
| 7 | Foot amputations | " | | R |
| 7 | " " | Chronic | | " |

TABLE SHOWING THE PERCENTAGE OF MORTALITY OF SINGLE AMPUTATIONS UPON THE DIFFERENT PARTS OF THE BODY:

| | | | Per cent. |
|----|---------------------------------------|----|-------------------|
| 13 | shoulder-joint amputations, mortality | 3 | or 23 |
| 39 | arm " " | 5 | " 13 |
| 27 | forearm " " | 2 | " 7.4 |
| 21 | wrist-joint & hand " " | 0 | " " |
| 1 | hip-joint " " | 1 | " 100 |
| 45 | thigh " " | 22 | " 48.8 |
| 22 | knee-joint " " | 8 | " 36.4 |
| 80 | leg " " | 20 | " 25 |
| 15 | ankle-joint & foot " " | 1 | " 6 $\frac{2}{3}$ |

100 of the above amputations were of the upper extremity; of this number 10 patients died, or 10 per cent.

163 of the amputations were of the lower extremity; of this number 52 patients died, or 31.9 per cent.

TABLE SHOWING THE INFLUENCE OF AGE UPON THE MORTALITY
AFTER AMPUTATIONS.

| AGE. | SINGLE AMPUTATIONS. | | | | SYNCHRONOUS DOUBLE AMPUTATIONS. | | | SYNCHRONOUS TRIPLE AMPU- TATIONS. | |
|-----------------------------|---------------------|----|-----------------|----------|------------------------------------|----------|------------------|---|----------|
| | Primary. | | S'c'nd- ary. | Chronic. | | Primary. | S'c'nd- ary.* | Chron- ic.* | Primary. |
| | | | | | | | | | |
| | R | D | D | R | D | R | D | R | D |
| | | | | | | | | | |
| 19 and under | 39 | 5 | 1 | 9 | 0 | 3 | | | 1 |
| Between 20 and 30 | 55 | 9 | | 12 | 5 | 6 | 1 | 1 | 1 |
| “ 30 and 40 | 25 | 12 | 2 | 18 | 4 | 0 | 3 | | |
| 40 and over | 21 | 14 | | 22 | 10 | 2 | 3 | 1 | 1 |

* None died.

In one of Dr. Geo. W. Norris's papers upon amputations,¹ previously referred to, mention is made of the mortality of such operations in the following terms:—"In a large hospital no operation is more frequently called for than that of amputation, and even where the time for doing it is judiciously determined, and the operation itself dexterously and well performed, the dangers to which the patient is afterward exposed, are so great as to render the subject worthy of all attention from the practical surgeon. Contrary to the opinion generally prevalent in this country, amputation, even under favorable circumstances, is very frequently followed by fatal results in civil hospitals. In the practice of the Hôtel Dieu, of Paris, it is said that not more than half of the cases prove successful,² and I have the authority of M. Hache, a former interne of the hospital of St. Louis, of the same city, for stating, that out of twenty successive amputations made in the year 1833, in that institution, twelve died, or 60 per cent. With one exception (that of a toe) all these were capital amputations, and at the time the statement was made some of the patients were remaining still uncured."

When we recall the fact, which is often overlooked in the comparisons of older statistics with those of the present day, that

¹ *American Journal of Medical Sciences*, August, 1838.

² *Gazette des Hôpitaux*, 1834.

anæsthetics have only been used to relieve suffering in these capital operations for a little over 40 years, and that the additional suffering inflicted before their use added largely to the shock and consequent mortality of this operation—we must, in summing up our conclusions as to the more favorable results obtained now, give credit to anæsthetics as important factors.

Again, the facilities for handling cases requiring amputation are greater now; the perfection of the railway system permits of the early inspection of the patients by the surgeon; and the accommodations offered to patients recently injured in the numerous hospitals scattered over the land, where with careful nursing and the constant presence of the house-surgeon, dangers can be met and guarded against—all tend to lessen the mortality of amputations.

From this *résumé* of amputations performed in a little over 14 years at the University Hospital, it appears—

1. That amputations of the lower extremity are more liable to prove fatal than those of the upper extremity. (Norris.)

2. That the rate of mortality is greater in proportion to the proximity to the trunk of the part amputated.¹

3. That, contrary to the statements usually made in other published statistics, the mortality of amputations for chronic

¹ Ashhurst, Principles and Practice of Surgery, 4th Ed. page 112.

disease is about the same as for recent injury—the former being 23.75 per cent., the latter 24.4 per cent. The explanation of this may be found in the fact that many of the cases were operated upon for chronic disease of a malignant character—sarcoma; etc.

4. That the danger increases with the age of the individual operated upon—a point previously brought forth in the investigations of Dr. Norris.¹

5. That in double synchronous amputations the prognosis is very favorable when the patient is under 30. Above that age the mortality is at least 75 per cent.—one chance in four in favor of recovery.

41 North Twelfth Street.

¹ *American Journal of the Medical Sciences*, August, 1838.

